REMARKS

Claims 1-8, are pending in this application. Claims 1-7, have been rejected. Claim 8 has been withdrawn from consideration as being drawn to a non-elected invention.

The applicant respectfully submits that no new matter has been added. It is believed that this Response is fully responsive to the Office Action dated **October 22, 2003**.

In view of the following remarks, further and favorable consideration is respectfully requested.

1. ***At page 2, paragraph 2, of the Office Action, claims 1-4 and 7, have been rejected under 35 USC § 103 (a) as being unpatentable over Gibbons (US 6,421,212) in view of DeOrnellas (US 6,287,975, and further in view of Nakatani (US 6,391,216).***

The Examiner states that the skilled artisan would have found it obvious to modify Gibbons by including the tantalum/tantalum nitride layer as a mask layer as disclosed by DeOrnellas, and modifying the resultant method by including a step of dry etching as taught by Nakatani.

Gibbons is directed to solving the prior art problem of taper and overhang, which problem causes a decrease of the permanent magnet induced longitudinal field, which in turn causes the formation of domain walls which affect the stability of the device. Gibbons is directed to a thin film read head where the problems of taper and overhang are solved by providing a thin film read head requiring a magnetoresistive element (20), a magnetic bias layer (150) formed with a taper and overhang portions, where the magnetic bias layer is directionally etched to remove the taper and overhang portions.

Gibbons discloses at col. 6, lines 47-49, that an under layer and an "overlayer such as Ta is usually desirable." While this passage appears to state that the bias layer which can be a CoPt alloy, can be provided with a Ta overlayer, it is clear from the entire disclosure that additional layers are provided on the bias layer only after the bias layer has been directionally etched to remove the overhang and taper.

In Gibbons, a base material (10) has a filler layer (115) including an insulation material such as Al_2O_3, SiO_2, or SiN_X, provided thereon. Filler layer (115) is directionally etched. Thereafter, a magnetic bias layer (150) is provided on the etched fill layer (15). The magnetic bias layer is then directionally etched to form a magnetic bias layer having a planer top surface.

DeOrnellas is directed to an etching method using a hard mask. The hard mask can be tantalum/tantalum nitride. In the method, the material to be etched has a hard mask layer provided thereon, where a photoresist pattern layer is provided on the hard mask layer. The resultant structure is first etched to define the hard mask layer, and the etched hard mask is then etched to define the pattern in the material to be etched. This method serves to control and minimize critical dimension growth of a feature during an etch process. Etching is performed in an etching reactor using for example, chlorine gas.

Nakatani is directed to a method and apparatus for reactive ion etching. Nakatani discloses etching a magnetic material thin film by reactive ion etching with a plasma of a mixed gas of carbon monoxide and a nitrogen-containing compound, to form a pattern on the magnetic material. Nakatani discloses that tantalum is not a suitable mask substance. See col. 5, lines 6-15.

In view of the following, this rejection is respectfully traversed.

The present claims require: (i) dry-etching with a reaction gas of carbon monoxide with an additive of a nitrogen containing compound gas; (ii) dry-etching using a mask made of tantalum or a tantalum nitride; and (iii) dry-etching a cobalt-platinum alloy layer, using the mask.

The present invention achieves a very large etching selective ratio. Thus, the mask itself is not deformed by etching. Further, etching of the work layer does not progress from the mask edge due to side etching. As a result, a fine micro-pattern is transferred on a work layer while retaining its precise shape.

It is submitted that the combination of Gibbons, DeOrnellas and Nakatani, is improper because there is no motivation, suggestion or incentive supporting the combination.

Specifically, the combination of Gibbons with DeOrnellas is improper because Gibbons is directed to solving the problem of taper and overhang which problems are solved by directional etching of the magnetic bias layer (the layer forming the taper and overhang). Gibbons ***requires*** directionally etching the bias layer ***without*** a mask layer provided thereon. DeOrnellas ***requires*** a two-step etch process where a photoresist layer is etched to define the hard mask layer and the etched hard mask layer is then etched to form the pattern. DeOrnellas ***requires*** the two-step process in order to solve the prior art problem of critical dimension growth.

Thus, the skilled artisan in view of Gibbons would have no motivation to look to art directed to critical dimension growth and requiring a photoresist and a hard mask layer (DeOrnellas). Likewise the skilled artisan in view of DeOrnellas which ***requires*** both a photoresist and a hard mask layer prior to etching, would have no motivation to look to art directed to directional etching ***without*** a mask layer (Gibbons).

Further, the combination of Gibbons and/or DeOrnellas with Nakatani is improper, because Nakatani ***teaches away*** from a tantalum mask. Nakatani clearly teaches that metallic elements including tantalum, cannot be used as the mask material.

Assuming *arguendo* the combination of references proper, none of the references taken alone or together, render the claimed invention obvious. Specifically, none of the references provide any motivation to modify Gibbons by including the tantalum/tantalum nitride layer as a mask layer as disclosed by DeOrnellas, and modifying the resultant method by including a step of dry etching as taught by Nakatani.

Because Gibbons ***requires directional etching without a mask layer*** in order to solve prior art problems, the skilled artisan would have no motivation to modify Gibbons by: (i) replacing the required directional etching step with the dry etching step of Nakatani, and (ii) providing a tantalum/tantalum nitride layer as a mask layer as disclosed by DeOrnellas.

Again, Nakatani ***teaches away*** from the present invention, since Nakatani teaches that tantalum ***cannot*** be used as a mask material in a CO-NH_3 gas plasma etch system. The present claims ***require*** a tantalum or tantalum nitride mask layer and a reaction gas of carbon monoxide with a nitrogen containing compound gas.

Gibbons ***teaches away*** from the present method because Gibbons ***requires*** directional etching ***without*** a mask layer.

In view of the above, it is submitted that a *prima facie* case of obviousness has not been established because the combination of references is improper, and even if proper they provide no motivation to modify Gibbons to obtain the presently claimed method. It is further submitted that nothing in any of the applied references, taken alone or together, render the claimed invention

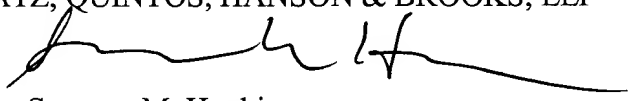
obvious within the meaning of 35 USC § 103. Accordingly, the Examiner is respectfully requested to withdraw this rejection.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicant's undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicant respectfully petitions for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP



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